III. Are claims 1-15 rendered obvious by U.S. Patent No. 6,432,540 to Gallo et al. in view of either U.S. Patent No. 5,760,146 to von Gentzkow or U.S. Patent No. 6,500,546 to Heine et al.?

Arguments

I. The use of both melamine cyanurate and a transition metal oxide containing an oxyanion of a Group VIA element is not suggested for use in a flame-retardant molding composition by the prior art of record.

The Office Action indicates that the Ogura patent discloses an epoxy resin composition which may contain either a melamine cyanurate or a transition metal oxide containing an oxyanion of a Group VIA element such as tungsten oxide. However, the Office Action also acknowledges that the Ogura patent does not disclose the use of these compounds together in a single composition. In fact, the Ogura patent presents a lengthy list of suitable compounds that provide flame retardance to a resin composition. Any one of those compounds can be used in the compositions described in the Ogura patent. There is no suggestion of Ogura to use more than one compound for the purpose of providing flame retardance, nor is there any guidance given as to the particular combinations of the many compounds disclosed therein which would provide an improved flame retardance to the resin composition. Therefore, claims 1, 2, 4, 15, 25 and 26 define over the Ogura patent.

In rejecting claims 3 and 27, the Office Action relies upon the Gallo '716 patent for teaching that tungsten trioxide is a suitable flame retardant. The combination of Ogura and Gallo '716 does not lead one skilled in the art to use more than one compound for the purpose of providing flame retardance. Neither patent provides any motivation to use more than one flame retardant and claims 3 and 27 define thereover.

Addressing the patentability of claims 1-15 from another direction, the Office Action cites to the Gallo '540 patent for disclosing a flame retardant composition containing an epoxy resin and tungsten trioxide. However, Gallo '540 fails to disclose melamine cyanurate. Each of the von Gentzkow and Heine patents disclose melamine cyanurate as a flame retardant. Again, there is no teaching in either of these references that would indicate the inclusion of both of these flame retardants would somehow produce increased flame retardance as asserted in the Office Action. Therefore, claims 1-15 define over the teachings of Gallo '540 taken with von Gentzkow or taken with Heine

II. Applicants have demonstrated the synergistic effect of using melamine cyanurate with a transitional oxide containing an oxyanion of a Group VIA element in a molding composition as claimed.

In a Declaration submitted with the Amendment of April 12, 2005, Dr. Anthony A. Gallo (the first named inventor of two of the references cited herein) submitted data comparing a flame retardant composition made in accordance with the present invention with prior art compositions. Three compositions were tested which are listed as Samples A, B and C in the Declaration. Each of those compositions contains the same amount of silica filler and epoxy resin. However, Sample A included two flame retardants: tungsten trioxide and melamine cyanurate, at 6% and 4% by weight, respectively. Comparative Example B contained 10% tungsten trioxide and Sample C contained 10% melamine cyanurate. In this manner, each of the samples contained 10 wt.% of a flame retardant.

The compositions A-C also included other components that are consistent with the production of a molding composition including filler, hardener, colorant, catalyst, wax and a silane coupling agent. The inclusion of these traditional molding composition components does not effect the demonstration of the synergistic effect of the two flame retardants tested in Sample A.

The Office Action acknowledges that the Declaration is effective in showing that a composition with 4 wt.% melamine cyanurate and 6 wt.% WO_3 together reduce flammability over compositions containing 10 wt.% of either melamine cyanurate or WO_3. However, the Office Action asserts that the Declaration does not "effectively" address the claims because claim 1 recites a Group VIA transitional metal oxide and the Declaration only tests WO_3. In addition, the Office Action asserts that the Declaration is not commensurate in scope with claim 1 because claim 1 does not contain all the constituents set forth in the Declaration, especially a silica filler. The Office Action also addresses independent claims 12 and 27, as well as the claims dependent on claim 1 which use epoxy, melamine cyanurate and WO_3 in amounts that are different from those used in Samples A-C. The Office Action also notes that claim 12 requires a phenolic hardener which is not included in the compositions tested in the Declaration.

The issue of whether the Declaration is commensurate in scope with the claims was discussed during the Interview of July 19, 2005. According to the Interview

Summary dated July 20, 2005, Examiners Christopher H. Keehan and Randy Gulakowski assert that there are at least four differences between the data set forth in the Declaration and claim 1. These differences supposedly include (1) the amounts of the components, (2) the presence of silica filler, (3) the use of tungsten trioxide and (4) the presence of a curing agent. These points are addressed in turn below.

Claim 1 is not limited by the relative amounts of the components. One important aspect of the present invention is that an epoxy-based molding composition having superior flame retardant properties is achievable when both melamine cyanurate and a Group VIA transitional metal oxide are included. The data comparing Sample A (both flame retardants) to Samples B and C (one flame retardant in each) clearly supports the patentability of claim 1.

Silica filler is used in molding compositions as is well known in the art. Even though silica filler is not required in claim 1, one skilled in the art would clearly know that a molding composition containing resin can be inexpensively expanded by including silica filler. The silica filler used in the samples tested in the Declaration does not effect the flamability tests because it is present in the same amount in each of the samples.

The only Group VIA transition metal oxide which was tested in the Declaration is WO_3. Tungsten trioxide is one of a very small set of compounds that meet the limitation in claim 1 of a Group VIA transition metal oxide. Group VIA metals include Cr, Mo, Wn and Sg. The number of oxide compounds of the four elements is very limited, on the order of a dozen or so compounds. In other words, there is not a great number and variety of compounds that could be included in the limitation in claim 1 of a transition metal oxide containing an oxyanion of a Group VIA element. Tungsten trioxide is one example of a compound that falls within this very small set of claimed compounds. This limitation at issue is restricted only to a very small set of compounds and thus, by comparing a composition containing WO_3 in combination with melamine cyanurate, similar results are expected with tungsten oxide as well as oxides of other Group VIA transition metals. One skilled in the art would expect that other transition metals of the Group VIA having the same valence structure as tungsten would produce the same results as the tested tungsten trioxide. The value of the evidence of non-obviousness presented in Dr. Gallo's Declaration is not diminished by a great number of other potential components which meet the limitation of being a Group VIA oxide.

In fact, the claimed composition encompasses a rather small number and very similar compounds. *Compare,* In re Lindner, 457 F.2d 506 (CCPA 1972).

The curing agent used in the samples described in the Declaration is not set forth in claim 1. Claim 1 is an open claim (uses "comprising" as the transitional phrase) allowing for an agent for curing the epoxy resin. A claim directed to a flame retardant molding composition that contains an epoxy resin would be understood by one skilled in the art to also use a curing agent for hardening the composition. However, its absence in claim 1 does not detract from the synergistic effect of the claimed flame retardants demonstrated in Sample A.

Conclusion

The cited documents fail to suggest the present invention involving a flame retardant molding composition substantially free of halogen and antimony that contains an epoxy resin and two particular flame retardants, namely melamine cyanurate and a transitional metal oxide containing an oxyanion of the Group VIA element. The Declaration submitted with the Amendment of April 12, 2005 clearly demonstrates the synergistic effect of these two flame retardants, regardless of the particulars of the filler and other compounding elements used in the tested samples. None of the prior art of record provides any motivation to include two flame retardants selected from the two components specifically required in the claims, namely melamine cyanurate (a single compound) and a transition metal oxide of a Group VIA element (a very small set of compounds). Accordingly, reconsideration and withdrawal of the rejections are appropriate.

Allowance of claims 1-15 and 25-27 is respectfully requested.

Respectfully submitted,

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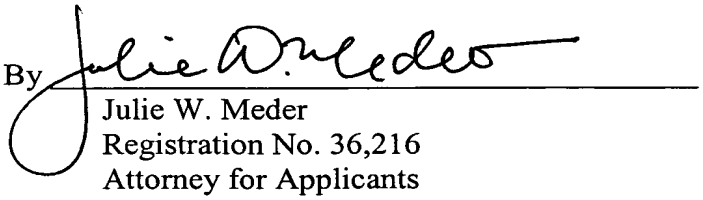
By 

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